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group

Mackenzie delta research project

MDRP 1. Mackenzie delta -
economic base and development,
by John R. Wolforth.

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THE MACKENZIE DELTA - ITS ECONOMIC BASE AND DEVELOPMENT

A PRELIMINARY STUDY

by

John Wolforth

This report is based on research carried out while the author was employed by the Northern Co-ordination and Research Centre. It is reproduced here as a contribution to our knowledge of the North. The opinions expressed however are those of the author and not necessarily those of the Department.

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FOREWORD

The Mackenzie Delta Research Project is an attempt to describe and analyse the social and economic factors related to development in the Mackenzie Delta. Particular emphasis is being directed toward the participation of the native people of the area, and the extent to which they are making effective adjustments to changes brought about by government and commercial expansion in the North.

The individual studies within the project and the conclusions arising from them will be published in a series of reports. This study, MDRP 1, by John Wolforth, was undertaken to provide background data and analysis necessary for a general understanding of the economic realities of life in the Mackenzie Delta. Its first purpose was to provide other researchers on the project with a basic guide or "outline map" of the economic geography of the area. No other suitable analysis was then available. It contains much of interest to people not directly connected with the Project, and is therefore being produced for general distribution.

Government
Publications

A. J. Kerr,
Co-ordinator,
Mackenzie Delta Research Project.

AUG 28 1967

PREFACE

This study is based on field work carried out in the Mackenzie Delta in July and August, 1965. The author spent some time in each settlement and also made brief excursions to Herschel Island and the Richardson Mountains.

Since the time available for gathering data was limited, the author restricted his enquiry to areas which he felt best reflected the total regional economy. Data on the wage and employment structure was gained by interviewing each employer, to whom the author expresses his sincere gratitude.

Thanks are also due to the game wardens, particularly Mr. F. Bailey, for making available the Fur Traders' Record Books and other sources for analysis; and to Mr. S. Johansson for providing data on the Canadian Reindeer Herd.

Information on the region's fisheries was obtained from Mr. W. Smith of the Canadian Fisheries Board, Mr. W. Menzie of Menzie Fisheries Co., and Mr. W. Hill of the Department of Indian Affairs and Northern Development. Mr. Hill also provided much useful information on the region's forestry programme, as did Mr. A. McLeod. The analysis of freight shipments into the region was only possible with the co-operation of Mr. T. Ross of

Pacific Western Airlines, and Mr. D. Robinson of Northern Transportation Co. Ltd. The area administrators or acting area administrators, and the regional administrator Mr. T. Butters, are also to be thanked for their freely given assistance.

While gratefully acknowledging the help of all of the above, the author of course assumes sole responsibility for his interpretation of the data which they made available to him.

The author did not concern himself with the domestic economy of the region, since this was to be the subject of a colleague's research. However, he would be remiss in not thanking all the local people, too numerous to mention by name, who provided valuable insights into those sectors of the region's life which are only peripherally linked to the money economy.

Finally, the author would like to express his appreciation for the assistance afforded by Mr. R. Hill of the Inuvik Research Laboratory, and for the companionship and helpful comments afforded by his co-workers, Mr. D. Smith, Dr. P. Cooper, Miss Jose Mailhot and the late Miss Constance Roux.

TABLE OF CONTENTS

CHAPTER 1:	INTRODUCTION: THE HISTORICAL BACKGROUND	1
CHAPTER 11:	RESOURCE-BASED ACTIVITIES	7
CHAPTER 111:	THE ECONOMIES OF THE SETTLEMENTS	40
CHAPTER IV:	CONCLUSIONS	65
CHAPTER V:	FUTURE RESEARCH DIRECTIONS	73
	REFERENCES	84

FIGURES

Figure 1	Registered Trapping Areas	10
Figure 2	Income from Trading Furs	15
Figure 3	Reindeer Range	21
Figure 4	Wage Employment, by Income and Ethnic Status	55

TABLES

Table 1	Muskrat Furs Traded Into Delta Settlements, 1964-65	17
Table 2	Mackenzie Reindeer Herd: Size and Numbers Unaccounted for, 1939-1964	20
Table 3	Sales of Reindeer Meat, March, 1964-March, 1965	24
Table 4	Reindeer Herd Reduction, 1964-65	25
Table 5	Numbers Employed in Logging in Delta Settlements	31
Table 6	Fish Caught Annually for Domestic Use	36
Table 7	Employment in the Settlements by Ethnic Status	41
Table 8	Inuvik Employment, July, 1965	43
Table 9	Inuvik Employment, by Income and Ethnic Status, July, 1965	45
Table 10	Winter and Summer Employment, Department of Northern Affairs and National Resources	47
Table 11	Inuvik Employment, by Income and Ethnic Status, July, 1965, Government Departments Other than NA&NR	48
Table 12	Inuvik Employment, by Income and Ethnic Status, July, 1965, Service Industries	50
Table 13	Inuvik Employment, by Income and Ethnic Status, July, 1965 (combined)	54
Table 14	Aklavik Employment, July, 1965	56
Table 15	Aklavik Employment, by Income and Ethnic Status, July, 1965	56

TABLES (Continued)

Table 16	Fort McPherson Employment, July, 1965	57
Table 17	Fort McPherson Employment, by Income and Ethnic Status, July, 1965	57
Table 18	Delta Settlements Employment, July, 1965	58
Table 19	Freight Shipped into Mackenzie Delta by Barge, 1964 and 1965 (in tons)	61
Table 20	Freight Carried on PWA Scheduled Flights to Inuvik (in lbs.) June 1, 1964-May 30, 1965	63
Table 21	Air Freight from Inuvik (lbs.), 1964	64
Table 22	Population in the Settlements, 1956-58	68
Table 23	Population in the Settlements, 1965	69

INTRODUCTION: THE HISTORICAL BACKGROUND

With a total population of some 3500, the Mackenzie Delta contains about fourteen percent of the people of the Northwest Territories. It is the largest of the two areas in the Canadian Northland where Eskimo and Indian cultures have impinged upon one another for several generations. In addition, it is the most easily accessible part of the Arctic from the south. It is served by regularly scheduled flights from Edmonton, as well as by barges travelling the Mackenzie River during the summer months. As a consequence, on an already complex cultural situation induced by long-standing Indian-Eskimo contact, have been superimposed the processes of acculturation associated with frequent and recurrent White activity in the area. These processes have been accelerated considerably within the last decade.

White contact has taken place in three phases: the whaling economy, the trapping economy, and lately, an economy characterized by an increasing concentration of population in settlements. At the turn of the century, the Beaufort Sea was an area favoured by whalers of many nationalities. This section of the Arctic Ocean abounded with Beluga and Bowhead whales, the latter especially highly valued as a source of baleen. By 1900, summer whaling camps were common

from Point Barrow to Cape Dalhousie and beyond, but the economic conditions which favoured the interest of whalers in the area were short-lived. Whale-bone was replaced by other materials, and the end of the Victorian era brought about changes in fashion which also reduced its potential market.

By the time of Stefansson's second visit to the Arctic, only a small number of whalers was encountered, although only a few years previously, Herschel Island in particular had been a burgeoning summer port filled with schooners. (Stefansson, 1941). Today, it is a bleak and lonely spot whose graves alone give mute evidence of its more exciting past.

The demographic as well as the social changes brought about by the presence of whalers was intense. In the Delta area, for the first time the Eskimo came into contact with White technology and jurisprudence as North-West Mounted Police posts were set up on Herschel Island at the turn of the century to police the activities, not only of the whalers, but of the indigenous population. The introduction of the rifle produced profound changes in the balanced ecology of the Eskimo way of life. The coastal herds of caribou were seriously depleted, as new hunting methods were tried and found successful. In addition, contact with the white man induced new needs and provided the means of achieving them. Many Eskimos at this time became very wealthy and amassed goods for which their fathers would

have found little use: but apart from the phonograph, the mechanical washing machine and similar devices, considerable investment took place in equipment with which to make a living. For example, almost all of the schooners still in use in the Mackenzie Delta today date from this period. As their useful life ends, they are to be seen as grounded hulks on the shores of the Beaufort Sea and along the Delta channels.

The whaling economy had been based on a resource for which the demand was at best transitory. This pattern was to be repeated in later decades with the fur economy. Massive influxes of capital in each case were not sufficient to provide a sound infrastructure for future development, since they were directed towards the exploitation of an ephemeral resource.

As commercial whaling declined on the coast, fur-trading posts reached northwards into the Delta. A post had been established at Fort McPherson as early as 1840, (Hench 1961: 86-103), and in the first decades of the present century others were established at Pokiak Point, opposite the present settlement of Aklavik (1912) and later at Herschel Island, Baillie Island, and Kittigazuit, (Innis 1956: 352).

Just as the coming of the whalers produced changes in Delta society, so also did the establishment of trading posts. Indeed, the changes wrought by the trading posts proved to be more permanent.

The attraction of the trading posts may be illustrated by the case of Fort McPherson. Until 1860, this was entirely an Indian settlement, closely guarded, in fact, against occasional raids by Eskimos from the north. By 1871, the summer population was evenly divided between Indians and Eskimos (Hench 1961) as the latter moved in to trade their furs at the post. As posts were established further north, the Eskimo summer population once more declined until Fort McPherson today is once more an entirely Indian settlement.

The trading post formed the first foci for permanent settlement, although in the initial stages their locations shifted somewhat. Even the most important trading post on Pokiak Point was moved across the Aklavik Channel to the present site of Aklavik in 1924.

Until very recently, a system of small trading posts has served a mosaic of hinterlands, each relatively limited in extent.

Several pertinent generalizations may be made about these trading posts. Almost without exception, they were founded by white trappers and were operated in conjunction with normal trapping activities. Their locations, although transitory in themselves, seem to form a spatial system in which each post had its own distinct trading hinterland. Finally, none formed a basis for permanent settlement.

This last consideration would seem to indicate that trading posts per se are not the root cause of population concentration.

Although the presence of trading posts created new needs, these could easily be satisfied by visiting the post infrequently, as is the case with many people at the present time. It is thought to be more likely that institutions fulfilling more frequently recurring needs were the major causes of population concentration. Such institutions would include the church, the schools, and latterly, the nursing station or hospital. It is significant that in Aklavik, the settlement grew up, not around the trading post established in 1912, but around the Anglican Mission established in 1919. It was the trading post which eventually was forced to relocate in order to provide retail services to the growing settlement about the Anglican mission.

Insufficient data is available to document the settlement-forming elements with any accuracy. However, a brief review of the early stages of each settlement indicates that the establishment of a trading post was a necessary although not a sufficient cause.

A trading post was established on the Peel River in 1840 and received the name Fort McPherson in 1848. Four years later, a group of Indians moved from their previous settlement on the Peel River opposite Stoney Creek, to Fort McPherson, (Hench, 1961). Their reasons for doing so were apparently not solely to be close to the post. Anglican and Roman Catholic missionaries came to the settlement at the same time, but in 1895 the Roman Catholic missionary moved with his converts to establish the settlement of Arctic Red River, (ibid).

A trading post was established by the Hudson's Bay Company at Pokiak Point in 1912, but there is no evidence that a settlement of any size developed about it. Some buildings still standing on this site may possibly date from this period. The major settlement developed instead around the Anglican mission and hospital at the present site of Aklavik.

Although a trading post existed opposite the present location of Reindeer Station, no settlement existed here until the Reindeer Depot was moved here from Kittigazuit in the late 1930's.

Thus in each case the establishment of a trading post per se did not lead to the concentration of population, although other institutions did indeed locate close to the trading post. It is difficult then to distinguish the demographic changes induced by the trading posts themselves from those brought about by other institutions which entered the area more or less concurrently and occupied similar locations.

The technological and social changes brought about by the introduction of the fur trade are easier to isolate. As suggested by Black (1961: 62-85) high fur prices in the 1920's did a great deal to stimulate interest in trapping for furs. White trappers moved into the area, bringing with them methods which were soon adopted by the native trapper, and steel traps and the .22 calibre rifle profoundly affected the ecology of the area.

RESOURCE-BASED ACTIVITIES

The natural resources of the Mackenzie Delta are scant. The remarkably persistent view that the North is a "treasure house" of resources has little foundation in the Delta. Even where natural resources do exist, their exploitation is hindered by climatic conditions, and above all by the short navigation season. There are two possible fields for development in the region--metals in the Richardson Mountains, and oil and natural gas in the lower Delta and the Peel Plateau. Mineral prospecting has been engaged in for some time, but with unencouraging results. Although a great deal of activity is under way in oil and natural gas explorations, it is not certain that large strikes would inevitably result in a burgeoning Mackenzie Delta economy. There is however, considerable room for research into the potential economic impact of oil and natural gas exploitation.

Consideration in this report will be limited to natural resources which are being exploited at the present time, or have possibilities for exploitation in the immediate future.

Trapping Today

Trapping was once the economic mainstay of the region. In the 1920's the price of a muskrat pelt reached \$1.30 (Black 1961) and white

trappers moved into the area in fairly substantial numbers. After a temporary drop in prices in the Depression, a further rise in prices was experienced, reaching as high as \$3.00 to \$3.50 for prime extra large muskrat pelts during the 1940's. Probably the region was as prosperous at this time as at any other in its recent history. This prosperity was, however, to be short-lived.

Muskrat, the main fur taken from the Delta, are taken in two ways. The best quality furs are from muskrat trapped during the winter months, but by far the greater quantity derive from muskrat shot in the few weeks following breakup. At the time when fur prices were high, trappers from outside the region were free to shoot muskrat anywhere in the Delta. It was felt at the time that this situation posed a serious risk to the muskrat population, as well as to the economic well-being of the Delta people.

Consequently, in 1948-49, the Delta was blocked off into Registered Trapping Areas, each of which was to be exclusively occupied by one trapper and his family. This system proved successful for a time, but within the last few years most Registered Trapping Areas have been relinquished. Today only a handful of Delta people still maintain their rights to Registered Trapping Areas, although many trappers do in fact still trap the areas previously registered in their names.

The failure of the system may be ascribed to a number of factors.

1. Although the size of the Registered Trapping Areas was sufficient when fur prices were high, as fur prices dropped most Registered Trapping Areas were found to be too small to provide an adequate income.
2. The boundaries of the Registered Trapping Areas were not always drawn to include lakes suitable for trapping. Local environmental changes which have taken place as, for example, lakes have drained or been silted up, were not accompanied by adjustments in the Registered Trapping Area boundaries.
3. Finally, many trappers abandoned their Areas to seek employment in the construction of Inuvik in the late 1950's.

A decade ago trappers were widely distributed over the Delta during the winter months since most of the Registered Trapping Areas were occupied. The southern two-thirds of the Delta in particular was trapped very intensively. The northern part of the Delta is poorer in muskrat than the south due to the greater fluctuation of water levels in the summer as on-shore winds cause the water to back up and flood dens (Stevens 1953). Even here however many trappers were able to make an adequate living. Registered Trapping Areas provided the assurance that conservation measures would bring benefits to the trapper putting them into practice. At this time, for example, some efforts

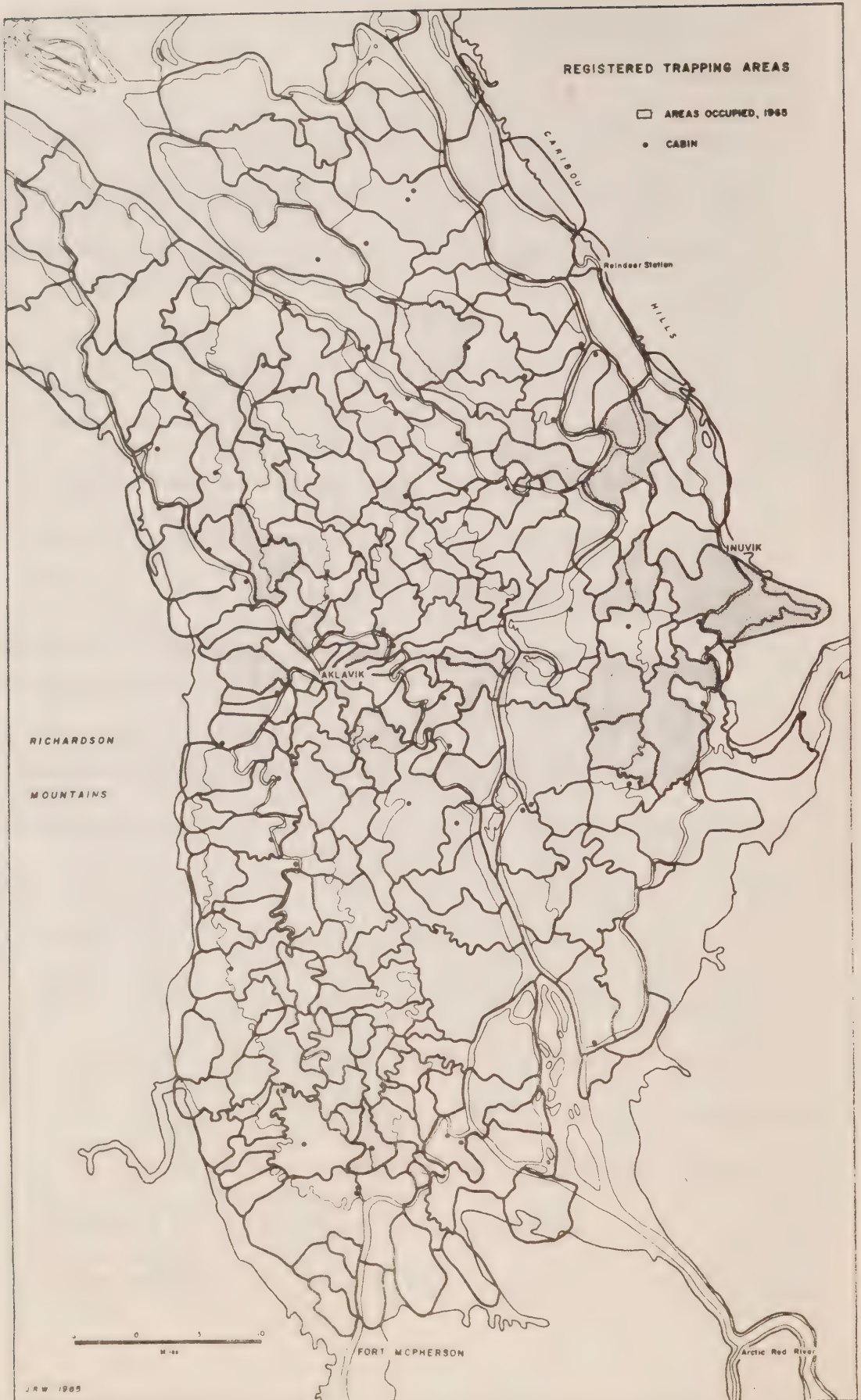


Fig. 1

were made to dam the small creeks draining the lakes into main channels and thus maintain water levels in the lakes. This practice has now been largely abandoned, but may be attempted again experimentally.¹ In addition to attempts at conservation, many trappers built permanent cabins on their Registered Trapping Areas (Fig. 1).

At the present time, most of the Registered Trapping Areas have been relinquished. Only a few trappers have maintained their areas (Fig. 1) and these are generally older people who value the security that occupation of a Registered Area affords. The majority of trappers would seem to prefer a greater freedom of choice in locating their winter camp.

If a comparison is made between the distribution of trappers a decade ago and the distribution today, several features become apparent.

1. There has been an absolute decline in the number of people maintaining winter camps in the Delta. There has not however been a decline in the numbers of persons trading furs into the Delta trading posts. In 1955, there were 386 trappers in the Delta, (Black 1961). In 1965, there were 391. The conclusion must be made that many of these people trap out of the settlements, or get all their furs from muskrat shot after breakup.
2. There has been a recession of the winter population in towards the settlements. The northern part of the Delta is in consequence

1. Frank Bailey, personal communication.

largely untrapped. While in the past camps were occupied all winter long, many trappers and their families now make frequent journeys to the settlements during the winter months. This would not of course be possible were they to maintain camps a long distance from the settlements.

3. The Delta now is divided into three discrete trapping hinterlands occupied by people from Aklavik, Inuvik, and Fort McPherson.
4. Within these hinterlands distinct nodes of concentration have appeared. The reasons for this tendency to concentration have not as yet been determined but are likely to be social rather than economic. Given the fact that most trappers operate along a 7 or 8 mile dayline, local concentration must surely result in over-trapping of the areas immediately adjoining the concentration node.

During the decade in which Registered Trapping Areas were maintained, considerable variation was experienced both in the annual muskrat take of each area and in the spatial distribution of the muskrat harvest. In the latter case, variation would seem to be due to the attributes and skills of individual trappers rather than to some spatially determined ecological variable.

Trapping today is for many people a source of "pocket money" in the slack winter months when less wage employment is available. Very few Delta people may be regarded as professional

trappers in the sense in which this term would be used even ten years ago. One-third of the trappers¹ of the Delta had incomes from trading furs of less than 100 dollars.² These people are maintaining a seasonal movement which seems to have little economic rationale at the present time. It is hardly surprising that for many the feeling of frustration is very evident and what little cash does derive from trapping is regarded as a "bonus" and spent accordingly.

Only fifteen trappers had incomes from trapping exceeding 2000 dollars. Of these, one alone had an income of almost \$10,000, but the income of no other trapper nearly approached this amount. These few people alone may be regarded as professional trappers at the present time, but it is significant that many did not trap the Delta at all but moved further afield to the Anderson or Firth rivers to trap the more lucrative marten. However, to set up for the winter in these more distant areas requires a cash outlay which few are able to make.

One of the more successful trappers who did trap the Delta outlined his annual sequence of activities as follows.

1. He moved to his winter camp in the northern part of the Delta in October. From October 1 until Christmas, he fished first in the still ice-free main channels and later by "jigging" under the ice.

1. The term "trapper" is here defined as a person trading furs into Delta trading posts.

2. Based on data for 1963-64, Trader's Fur Record Books.

2. In December and continuing into January, he trapped for mink along day-lines operated from his cabin. Trapping was slow until the end of February.
3. From March 1 until mid-June, he took most of his muskrat, first by trapping from day-lines and later by shooting from a canoe. The greater number were taken by this latter method.

Black (1961) has commented upon the greater proportion of furs taken from muskrat shot after breakup. This trend was perhaps more evident in 1964-65 than when observed by Black. By far the greater majority of muskrat pelts were traded in May and June, 1965. (Table 1). Significantly, the price differential between shot muskrats and trapped muskrats was slight. There is thus little economic encouragement for trapping as opposed to shooting. Shooting for muskrat after breakup may be carried on by any General Hunting Licence holder from the settlement with little capital outlay in special equipment.

It is not then surprising that the majority of trappers do a little trapping from the settlements, but derive the majority of their income from shooting muskrat after breakup.

Fort McPherson

In Fort McPherson, trappers went in the past to the Group Trapping Area in the Middle Peel valley for marten. However, in the last few years, the high costs of transportation have evidently deterred many from doing so. A few trappers will go up the Peel River by canoe in the Autumn, and return after the earlier breakup to shoot muskrat in the Delta.

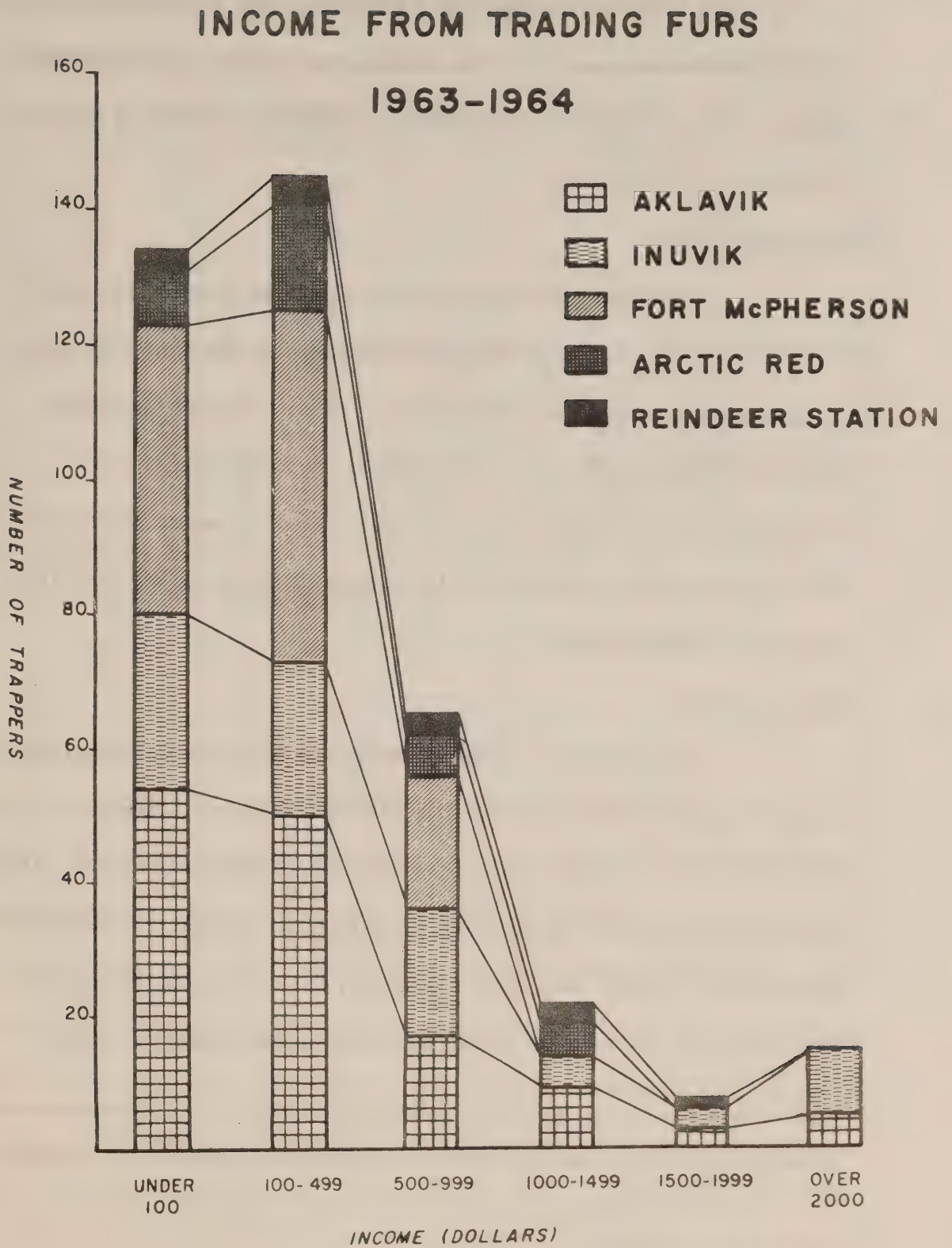


Fig. 2

A total of 226 marten, 59 beaver, and 24 mink were taken by Fort McPherson people in the middle Peel valley in the 1964-65 season.¹ This relatively small take is likely to discourage trapping in this area in the future.

Arctic Red River

No camps are maintained in the Delta proper by Arctic Red River people, although three families spend the winter at Indian Village on the mouth of the Peel River. Most trappers from this settlement move up the Arctic Red River or to Marten House. A few families from Arctic Red River (including the band chief) have taken up permanent residence at the mouth of the Tree River a few miles up the Mackenzie.

Aklavik-Inuvik

The majority of Aklavik trappers trap the Delta, although four were on Herschel Island in the 1964-65 season. The greater proportion however, operate trap lines from the settlement itself. More trappers move further afield from Inuvik in the winter than from other settlements. During the 1964-65 season, three were on Herschel Island, four on Travailant Lake, and five on the Anderson river.

¹ Monthly records of Game Ordinance Licenses, RCMP, Ft. McPherson.

Table 1--Muskrat Furs Traded Into Delta Settlements, 1964-1965

	Aklavik	Inuvik	McPherson	Others	Total	Avg. Price
July		482			482	.56
August		181			181	1.58
September		12			12	.90
October						
November		11	13		24	.78
December			9		9	.50
January	71		46		117	.70
February	428	47	69	111	655	.88
March	3,101	1,809	1,978	909	7,797	.79
April	3,122	5,626	2,791	893	12,432	1.15
May	3,599	1,538	3,035	335	8,507	1.18
June	16,613	10,681	12,285	2,964	42,543	.99

Source: Trader's Fur Record Books.

Reindeer Herding¹

The Mackenzie Reindeer Grazing Reserve is an area of some 17,900 square miles extending from the Mackenzie Delta eastward to the Anderson River. Much of this area is underwater, especially in the north where lakes cover from 30 to 50 percent (Mackay 1961: 98). The northern and eastern sections of the reserve are within the Arctic tundra and the southern and western sections are covered with a low spruce forest.

Reindeer herding was introduced into this area in 1935, when a herd of 2370 head was driven overland from Alaska.

¹
The account of Reindeer Herding is based largely on conversations with Mr. Sven Johansson, Manager, Canadian Reindeer Project.

The first years of herding reindeer were very promising and the herd more than trebled in numbers between 1935 and 1942. This rapid growth may be ascribed to the fact that the range had been unused. After 1942, some problems were experienced.

1. Two herds had been set up under the control of natives, but these were returned to the Government herd after the accidental death of both owner-managers.
2. Some Eskimos left reindeer herding to return to trapping, a fact which may be ascribed to economic as well as cultural determinants.
3. Unlike the Lapps, Eskimos had not been used to animal husbandry. While for the Lapp, living reindeer have intrinsic value as a measure of wealth, for the Eskimo this value resides only in the cash income which the reindeer carcass represents.
4. Unfortunately, during the 1940's this income was always less than could be expected by a capable trapper. Fur prices were higher than at any other time (Black 1961), while the wages paid to reindeer herders were low, and the work boring and arduous.

It is little wonder that small interest was stimulated in reindeer herding during this period.

After 1947, a summer school programme was set up, and attempts made to re-establish native herds. Once again, these attempts met with little success. Each of the four native herds set up between 1949 and 1954 diminished in numbers in a very short time, and was eventually relinquished.

The practice of close herding had been borrowed from the Lapps, but was evidently not suited to Canadian conditions. The herds were much larger than those found in Scandinavia, and when confined to a small area were unable to make maximum use of available grazing. These herding techniques were favoured because they were considered to minimize losses due to straying. However, losses due to malnutrition and resulting "soft-bone sickness" were undoubtedly great.

Mr. Sven Johansson, the present manager of the Reindeer project, considers the losses by strays are likely to be slight, although small groups of animals may leave the main herd for a short time. From detailed observations, it seems unlikely that these small groups leave the Reserve, although it is possible that some mixing with caribou takes place east of the Anderson River.

Although adult caribou and reindeer are similar in appearance, reindeer fawns are born early in the spring and are dark in colour, while caribou fawns are born later and have a reddish-brown colouring.

Little variation in colouring has been observed either in the young of reindeer or of caribou in adjacent areas, as would be expected had inter-breeding occurred. Conclusive evidence is not available on the problem of strays, but it seems likely that the losses from this source are not high.

Since the inception of reindeer herding, large numbers of animals have been unaccounted for (Table 2). Heavy losses are common

Table 2--Mackenzie Reindeer Herd: Size and Numbers Unaccounted For, 1939-1964

Year	Herd Size	Unaccounted	Percent
1939	5342	588	11
1940	6635	219	3
1941	8157	70	1
1942	9374	329	3
1943	9231	1180	12
1944	8609	1224	14
1945	no record		
1946	6568	2225	34
1947	6343	1271	20
1948	6679	708	11
1949	7219	780	11
1950	7560	1111	14
1951	8522	550	6
1952	7697	1763	23
1953	7814	736	9
1954	7844	715	9
1955	6595	1206	18
1956	6075	872	14
1957	5941	558	9
1958	5571	1239	22
1959	4138	265	6
1960	4926	140	2
1961	5012	951	19
1962	5613	775	13
	(7736) ^a	(1272) ^a	16
1963	5073	1036	20
1964	5942	466	8

Source: Data provided by Mr. Sven Johansson, Manager of Canadian Reindeer Project. Those from 1939 through 1958 include all herds, from 1959 through 1964 include government herds only, annual roundup figures. Figures in brackets from 1963 include government herd and Native Herd Number 4.

Reindeer Range



Fig. 3

in other countries, however, and previous experience on the Mackenzie Reserve indicates that close herding is not the solution to this problem.

Since March, 1963, reindeer herding has been carried on under contract to the Department of Northern Affairs and National Resources, and open herding has been substituted. Under this system, the reindeer are allowed to roam freely over an extensive area, the boundaries of which are patrolled to prevent straying. Aerial reconnaissance is used extensively to check on movements of the herd. This system, although only used for a short time carries several advantages.

1. Less labour is required to control the limits of an extensive area than was required to keep the reindeer in close herds.
2. More efficient use is made of the Reserve since the animals are free to select the best grazing and less likely to destroy potential food by trampling.
3. The natural seasonal movements of the herd may be exploited with greater ease.

In general, the herd movements are expected to follow a sequence from the northern part of the Reserve in the summer to the southern part in the winter (Fig. 3). Limits upon the potential size of the reindeer herd are likely to be set by the summer rather than the winter range. The summer range has been utilized in the past to such an extent that the potential grazing has been much depleted. With the extremely slow growth rate associated with the Arctic barrens,

replenishment will take some years of less intensive use. In addition, the total grazing potential is substantially reduced by the large percentage of the area in lakes. In August, high temperatures on the summer range have deleterious effects on the herd. In contrast, the winter range has been little used to date, and grazing conditions are very good although some of the winter range was destroyed by fire a decade ago. Research is presently under way by the Canadian Wildlife Service to determine the maximum number of reindeer the Reserve may be expected to support. With evidence presently available, 25,000 to 30,000 head does not seem an unreasonable estimate. A program drawn up by Mr. Sven Johansson envisages a herd of 30,000 by 1969. A herd of this size would probably require additional summer grazing east of the Anderson River, which might well have effect on the trapping in this area. At present, laws forbidding the taking of reindeer or caribou in the Reserve deprive the few trappers in this area of a potential source of meat.

It might be advantageous in this area to permit hunting of rangifers in the winter, especially if it were to become necessary to extend the Reindeer Reserve eastwards.

The future success of reindeer grazing in the Mackenzie area is more likely to be a function of economic than of physical determinants.

At present the majority of reindeer meat is consumed

locally, although small amounts are shipped elsewhere in the territory. The use of a "Canada Approved" slaughter house would be a necessary condition to marketing outside the North West Territories. At present, all production is disposed of, and there is at most times a local shortage of reindeer meat (Table 3).

Table 3--Sales of Reindeer Meat, March, 1964-March, 1965

Reindeer carcasses	74,015 lbs.
Fawn carcasses	11,129 lbs.
Organs	2,052 lbs.
Legs	1,309 lbs.
Tongues	544 lbs.
Heads	559 lbs.
Other Sales	
Skins	800 lbs.
Antlers	638 lbs.
Live fawns	20 lbs.
Herders' meat issue	7,320 lbs.

Source: Sven Johansson, Manager, Canadian Reindeer Project.

*In 1966, trappers were able to take caribou between the Kugaluk and Anderson rivers if they obtained a permit to do so.

The present production of meat is about 1200 pounds per 100 reindeer in the herd which does not compare favourably with operations in other countries. However, in the opinion of Mr. Sven Johansson, this could be increased to 5000 pounds per 100 reindeer. With a herd of 30,000 head this would require finding the market for

1,500,000 lbs. of reindeer meat each year. Sales of this amount, it must be mentioned, are based upon optimistic estimates both of the potential herd size and production. Economic management of the herd is not necessarily dependent on selling this quantity of reindeer meat. However, even on the basis of more conservative estimates, considerable expansion of the market for meat would be required if the Reindeer Project is to become economically viable.

Table 4--Reindeer Herd Reduction, 1964-65

	Slaughter	Live Export	Sickness	Predators	Camp Meat
April	-	-	2	3	2
May	-	-	2	-	2
June	41	-	-	-	-
July	-	20	4	-	4
August	-	-	2	7	7
September	-	-	-	6	12
October	-	-	-	-	-
November	5	-	-	11	12
December	4	-	7	-	17
January	442	-	4	6	2
February	78	-	2	5	3
March	21	-	3	12	3
Year	691	20	26	50	64

Source: Sven Johansson, Manager, Canadian Reindeer Project.

The continued operation of the Reindeer Project is to be desired. Its present impact on the regional economy is almost entirely beneficial. The inconvenience caused to trappers not being able to

take rangifers on the Reserve is small when weighed against the fact that the Reindeer Project provides a secure economic support for the community at Reindeer Station.

Reindeer Station

The community at Reindeer Station was established a few years after reindeer herding was introduced to the Western Canadian Arctic. It succeeded Kittigazuit as the centre of operations for Reindeer herding and at the time of its establishment was the only settlement on the Eastern side of the Delta. In the first year of operation, the herders and their families followed the herd, and lived the year round on the range, but more recently the families have remained in Reindeer Station, while only the herders are working on the Reserve.

Whether Reindeer Station remains a viable community following the establishment of Inuvik is an open question. An argument could be made for the abandonment of Reindeer Station, and the relocation of the herders and their families at Inuvik. The operating expenses of the settlement are a not inconsiderable portion of the project's expenses and the major market and shipping point for reindeer meat is in Inuvik. However, the present location of Reindeer Station is more accessible to the projected summer, autumn, and winter ranges than Inuvik would be.

In addition, Reindeer Station acts as a service centre for the north-eastern portion of the Delta. The capital investment

in Reindeer Station's present location may represent the most potent economic argument against its relocation.

Quite apart from purely economic considerations are the desirable social relationships which have evolved in Reindeer Station, the dislocation of which could have unfortunate consequences. Reindeer Station appears to have a greater degree of social health than other Delta settlements. The worker in the Reindeer Project makes a sufficiently high wage to maintain a satisfactory standard of living. Either directly or indirectly the settlement supports a dozen households with a combined population of about 60 persons. The social and economic health of the community is reflected in the fact that social welfare payments are minimal. Stability in the labour force of the Reindeer Herding Project is encouraged by the fact that residence in the settlement depends on job tenure. Were the operation transferred to Inuvik it is doubtful whether this situation could be maintained.

Apart from the permanent employees at Reindeer Station, casual labour is employed at various times of the year during round-ups. Wages for such casual employment represent a not inconsiderable benefit to Delta families.

Forestry

The Reindeer Project represents an attempt by government to provide employment based on the exploitation of the only semi-domesticated animal which may thrive in this area. Although the natural

vegetative cover offers little encouragement for commercial exploitation, forestry has been treated recently in rather the same way.

The forest resources of the Delta have little potential use other than that of fulfilling some local needs for poor quality lumber. Although the timber up the Peel and Arctic Red River is of better quality. The forest cover in the Delta is generally stunted, the two principal species of potential economic value, the white spruce (Picea glauca) and, to a lesser extent, black spruce (Picea mariana) seldom exceeding fifty feet in height. As would be expected so close to its northern limits the maturation period is extremely slow, and reforestation, even if it were technically possible, would need to be based on a renewal period greatly in excess of that common in the south. A further consequence of slow maturation is the extremely close grained nature of the timber, fifty rings to the inch being by no means unusual. In addition, since branching occurs closer to the ground than in southern forests the lumber produced from Delta trees is often knotty. These two factors alone will prevent it competing successfully with sawn lumber imported from the south.

Distribution of Forest Growth

Within the Delta itself, the spruce forest appears to be extensive when viewed from the channels. Appearances are however deceptive, since the spruce seldom extends far from the levées, and

conceals a more generally widespread cover of low willow and alder, neither of which is of economic value.

The amount of land in spruce increases southward from ten percent in the vicinity of Aklavik to forty percent on the southern edge of the Delta (Mackay 1963: 167).

The distribution of spruce is linked to conditions of flooding and fluctuation in the depth of permafrost. Thus the northern limit of spruce, according to Mackay (ibid, 172) corresponds to a levee height of about ten feet above sea level. On levees below this height, as of course in the low lying land behind the levees, flooding following break-up prevents the establishment of spruce.

Exploitation of Forest Resources

These limiting factors have certain corollaries for exploitation.

Since the spruce cover is most dense on the levées, trees may be removed with relative ease and with little or no expensive equipment. Dog teams have been found quite adequate for hauling small timber from the levée on to the frozen channels to await breakup. This method however does place a limit on the size of logs. More areally extensive exploitation of spruce would be limited, not only by the lack of appropriate equipment, but by the linear nature of the spruce cover itself.

There is little possibility of a forestry programme in the

area which would serve any purpose other than: (i) fulfilling some local need for lumber, especially for squared logs, pilings, rough boards for sidewalks, and similar uses, and (ii) providing employment in logging and saw-mill operations.

These purposes must not be depreciated, however. Certainly, in the southern part of the Delta, forestry operations are contributing to the regional economy at present, and may be expected to do so in the future.

Logging

Logging, as opposed to the gathering of driftwood for fuel, has been carried out on an ad hoc basis for many years.

The Department of Northern Affairs has actively encouraged Forestry more recently, initially under the auspices of Educational Division and Welfare Division. The original purposes for government entry into this field were two-fold: to provide employment, and to provide training. Thus, its economic operation was secondary to spreading the available funds through as many families as possible. In the winter of 1960-61, ninety-one men were employed in logging and earned a total of almost \$21,000. After 1963, the work was transferred to Industrial Division in the hope that it had now become economically viable. In contrast with the earlier operations, in the winter of 1964-65, sixty-four men were employed in logging and earned a total of about \$18,000. Thus,

although fewer men were employed, each earned more, and was able to regard logging as a more useful supplement to any other winter earnings. This tendency is likely to continue in future years.

Logging has been more significant as a source of employment for the southern Delta settlements, both under the jurisdiction of Educational Division and of Industrial Division.

Table 5--Numbers Employed in Logging in Delta Settlements

Settlement	1961-62	1962-63	1963-64	1964-65
Aklavik	22	24	n.a.	17
Inuvik	19	16	n.a.	=
Fort McPherson	44	57	n.a.	28
Arctic Red River	6	10	n.a.	9

Source: W. Hill, pers. comm. (n.a. = not available)

Here, because of the lack of other employment opportunities, the need for employment in logging is greatest. Many men in the Delta are quite familiar with logging practices, and represent a reservoir of elementary skills which should not be permitted to go untapped. However, the expansion of the logging programme would be dependent upon the expansion of sawmill facilities which in turn would depend upon the stimulation of the local market.

In addition to the logging project of the Department of Northern Affairs, some logging is stimulated by the house-building program of the Indian Affairs Branch in Fort McPherson, and by a limited number of contracts for piling.

Sawmilling

At present, about six sawmills are in existence in the area in various states of repair. Only two of these have been operating recently on any extensive scale, although one has been used downstream from Fort McPherson on the Peel River for cutting lumber used by the owner for building his own house. Apart from this one small exception, sawmilling is entirely a government preserve at the present time.

The Aklavik Sawmill

The Aklavik Sawmill is the largest operation, and is at present under the direction of Industrial Division.

The sawmill is located on the Pokiak Channel, across the Aklavik Channel from the main settlement. This site, which is close to the original location of the Pokiak Point Hudson's Bay Company post set up in 1912, has a major disadvantage at the present time. Separated as it is from the main settlement, it is reliant upon its own source of power. This is not a major inhibition at present, when the equipment in use consists of one sawmill and one planer, the latter only used intermittently. However, if the expansion of facilities were to take place, inaccessibility to the facilities of NCPC would present some limitations. In addition, the transportation of mill employees to work ties up canoes which could be used for other purposes.

However, the major asset to the mill's present location is that logs floated down from the Esau Channel may be boomed here

with greater facility than would be possible across the Aklavik Channel. It is significant that the same feature was appreciated by the local private sawmill, which had a similar location¹. Some account of the sequence of transportation methods in use will be appropriate at this point.

1. Timber is cut on the banks of the Esau Channel and the Peel River during the winter and hauled by dog team on to the ice. About fifteen Aklavik men were employed in the winter of 1964-65 on the Esau Channel and their earnings totalled \$6618.00. Thirty-two Fort McPherson men were employed on the Peel River and their earnings totalled \$6800.00.
2. At break-up, the logs are either hauled to the mill by canoe, or by the Northern Affairs vessel, Iqaluppik in booms, or allowed to float down with the current. Some difficulties have been experienced in the past due to booms breaking and considerable quantities of logs being lost.
3. The logs are stored in the Pokiak Channel, adjacent to the mill, until they are required for sawing.
4. Sawed lumber is loaded onto a small barge and taken on the Iqaluppik to its markets, which at present are found in Inuvik, Aklavik, and to a small extent at some oil camps in the coastal islands.

1. Roy Wright, Fort McPherson, personal communication.

Since over one-half of the forest resources currently being exploited are within 21 miles of Aklavik, it would seem that a small portable mill would be able to function more economically than at the present fixed location without serious inconvenience to the labour force. This would reduce the cost of booming and transporting logs, which at present accounts for about 25 per cent of the total cost of the lumber f.o.b. millsite.

An alternative would be to locate the mill at the largest market (i.e., Inuvik), but if this were done, considerable problems would be experienced in transporting logs to this location from the present exploitation area. However, a portable mill would enable sawn lumber to be stockpiled in Inuvik rather than at its present rather inaccessible location, in order to facilitate marketing.

At present there appears to be a somewhat justifiable prejudice against locally produced lumber. It is true that it is unsuitable for many purposes, but a more accessible lumber yard would undoubtedly encourage its competitive position with regard to imported lumber.

The sawmill at present employs nine local men working a seven-day week during the summer months. All are largely unskilled, with the exception of the sawyer. The mill is under the supervision of a skilled operative from outside.

From an initial production in 1961 of some 86,000 board feet of rough lumber production has risen to 316,000 board feet

in 1964 plus 61,000 board feet of planed lumber. However, the fact that about 500,000 board feet are stockpiled at the mill suggests that sales have not been able to meet production.

Thus, an essential requirement of the continued operation of the sawmill is the expansion of local markets.

Fort McPherson Sawmill

A sawmill has been operated sporadically at Fort McPherson in connection with the house construction work of the Indian Affairs Branch. Although Fort McPherson is close to better stands of spruce, the settlement does not furnish the suitable site for a sawmill. The mill in operation in the summer of 1965 was located behind the settlement, logs being hauled by truck or tractor from the waterfront.

The operating procedures in Fort McPherson were quite different from those used in Aklavik. Logs were cut and transported to the mill by individuals interested in constructing their own houses. Thus, the operations here were carried out as a service provided by the Indian Affairs Branch, and not as a commercial enterprise.

Fishing

Although many fish are taken for domestic use from the Delta and adjacent parts of the Beaufort Sea, large scale fishing has not as yet been attempted commercially.

Estimates as to the quantity of fish available vary considerably. The amount of fish taken for domestic purposes is difficult to determine. Black estimated the total consumption by dogs as somewhat under one million pounds (Black 1959), and it seems likely that dogs account for the major portion of consumption. In the light of Ferguson's findings that each family uses 20 pounds of fish per day in the Tuktoyaktuk (Ferguson 1961), it does not seem unreasonable to suggest a total annual consumption of between 1,500,000 and 2,000,000 lbs. for the Delta and adjoining coastal areas. The following tentative estimates have been made by the Canadian Fisheries Board (Table 6).

Table 6--Fish Caught Annually for Domestic Use

Settlement	Catch
Inuvik	350,000 lbs.
Aklavik	500,000 lbs.
Ft. McPherson	555,000 lbs.
Reindeer Station	100,000 lbs.
Arctic Red River	110,000 lbs.
Tuktoyaktuk	600,000 lbs.

Source: Wes. Smith, pers. comm.

Fishing is undoubtedly an important subsistence activity for a large number of people in the Delta and small quantities of fish enter the local market commercially.

Commercial fishing will only be economically sound if;

1. It can be shown that the present catch may be substantially exceeded without risking depletion, and,
2. Access may be found to outside markets large enough to encourage favourable freight rates. Some attempts have been made recently by the Department of Northern Affairs and National Resources to encourage commercial fishing. These attempts as yet have met with little success. In the summer of 1964, 88,655 pounds of Whitefish were caught in the vicinity of Holmes Creek.

Whitefish Taken
July 16-August 18, 1964

Good	42,450
Culls	<u>34,904</u>
Total	77,354
Weight	88,655 lbs.
(Rough Fish	11,301 lbs.)

The products obtained for this summer's activities were whitefish fillets, frozen whole whitefish and fish meal concentrate.

Products Obtained from Whitefish Project, 1964^a

Fillets	2,200 lbs.
Frozen Whole Whitefish	26,460 lbs.
Fish meal concentrate	5,000 lbs.

^aW. Hill, pers. comm.

The operation was carried on in conjunction with whaling activities at Whitefish Station, and the fish were purchased from local

people in the vicinity. The cost of purchase formed the major part of both fillets and frozen whole fish, so that the cost of the finished product in both cases was sufficiently high to render competition with other sources of fish difficult. Much of the frozen whole fish remains unsold to the present time.

The fish meal concentrate, in addition, carried a price which would not appeal to local consumers, even although it was offered on the market at a considerable reduction. In order to be used as dog food, the concentrate had of course to be mixed with corn meal, the purchase of which added further to the cost. At present the fish reducing plant, which is mounted on a barge, is located at Reindeer Station where it is used for producing dog food from reindeer offal.

The Whitefish project supplied a total of eleven men with employment in the freezing, filleting and reducing operations for one month. In addition, it provided a source of cash for some families staying on the coast. Each of these two benefits was, however, obtained at high cost.

Commercial fishing, whether organized by government or by private fisheries, is likely to be beset by several problems.

The fishing season ends close to freeze-up. Thus ships fishing late into the season run the risk of being frozen in. In addition,

ships providing transportation to the South for fish products run similar risks, a factor which may be expected to increase transportation costs. If commercial fishing were to be attempted in Liverpool Bay, a road from Eskimo Lake to Tuktoyaktuk would reduce this risk, since the shipment point could be transferred to the latter location, where freeze-up is generally later.

3. Capital expenditure in processing equipment is likely to be high.

The approximate cost of a blast freezer and refrigerator mounted on a barge is of the order of \$150,000¹. Few private operators are likely to be ready to invest this amount of capital in what is at best an uncertain commercial enterprise.

4. Transportation costs are likely to remain sufficiently high to discourage the export from the area of any but the best quality fish. Arctic Char and Jumbo Whitefish would seem to offer the best opportunities for future development if for this reason alone.

1.

W. Menzies, Edmonton, personal communication.

THE ECONOMIES OF THE SETTLEMENTS

The exploitation of local natural resources contributes little to wage employment. The majority of wage earners, both white and native, are employed in what may be loosely classified as "service activities". The status attached to the wage-earner has resulted in a reversal of the traditional value system which is regretted by many local people. In general, the man who is self-employed and makes his living by exploiting natural resources and thereby contributing to the economic self-sufficiency of the region, receives less for his efforts in terms of prestige as well as income than the wage-earner. The fact that the latter appears to make little real contribution to the economic growth of the region is the result of much hard feeling among trappers in particular.

Employment in Inuvik

Wage employment is of course almost entirely confined to the settlements. Only very few wage-earners have jobs which carry them outside Inuvik, Aklavik, or Fort McPherson. The only major exceptions to this generalization are the reindeer herders of Reindeer Station who spend a large part of their time on the Reserve.

Of these settlements, Inuvik provides by far the greatest number of permanent jobs. It is significant, however, that

these are occupied predominantly by whites (Table 7). The role of Inuvik in northern development has often been distorted. Far from being a centre of change, where the native has access to a wide range of job opportunities, his role is often that of a bystander of the economic scene. The majority of jobs and especially the high paid jobs are occupied by whites from "outside".

Table 7--Employment in the Settlements by Ethnic Status

Settlement	White	Indian	Eskimo	Other ^a	Total
Inuvik	320	50	83	36	489
Aklavik	23	7	19	3	52
Fort McPherson	30	25	-	4	59
Arctic Red River	2	-	-	2	4

a. The term "other" is used in this report to designate those of mixed blood.

Inuvik of course is the centre of government activities, and thus of employment in government service. But in addition, the large and relatively affluent white population has enabled service activities with a high threshold¹ being able to survive. Thus, Inuvik has retail functions which would certainly not be present in a village of similar size outside. Inuvik is frequently pictured by the more discerning local people as a place where "people take

1.

"Threshold" is used in the urban geographical literature in the sense of "the minimum population required to support a given type of establishment".

in each others' washing". In a sense, this is true. Wage employment is almost entirely in the nonbasic¹ sector. The inputs provided by the basic sector of the economy, of which trapping is the major example, are very small. However, it must not be forgotten that many of the service functions of Inuvik serve not just the local population, but also people from other settlements and from the Delta staying "in town" temporarily, and the summer influx of visitors from outside. The money spent by these people represents a very real input into the area which, with the data presently available, it is not possible to document. The majority of these service functions are provided by private enterprise. Thus, although government jobs provide the major source of employment, the number of those in the private sector is by no means negligible.

Of the total number of jobs available 66.5 percent are in the government sector, excluding the RCMP and HMCS Inuvik service personnel (Table 8).

1. Basic" activities are those which bring money into a settlement through the services its inhabitants perform for a wider region. In contrast, "nonbasic" activities involve an exchange of money derived from basic activities through services rendered by one member of the community to another.

Table 8--Inuvik Employment, July, 1965

Government Departments	White	Indian	Eskimo	Other
Dept. of Northern Affairs				
Civil Servants	21	-	1	-
Permanent Employees	8	3	18	7
Casual Employees ^a	12	9	37	20
Teachers	49	-	-	-
Inuvik Research Laboratory	3	1	-	-
Dept. of Public Works	6	-	-	-
Dept. of Transport	23	1	-	-
Citizenship and Immigration	3	-	-	-
National Health and Welfare	75	11	12	1
Dept. of National Defence ^b	-	1	1	2
Total Government	200	26	69	30
Service Industries				
Barber Shop and Beauty Salon	2	-	-	-
Canadian Imperial Bank	4	-	-	-
Hudson's Bay Company	15	-	-	-
Imperial Oil	5	-	-	-
Inuvik Development Corp.	5	-	-	3
Mackenzie Hotel	12	2	1	-
F.L. Semmler	1	-	2	-
Tuk Traders	1	-	1	-
Government Laundry	2	3	2	1
Territorial Liquor Commission	1	-	1	-
^a Classificatory term.				
^b Excluding service personnel.				
Other Industries				
Douglas Trucking	2	-	1	-
Great Northern Airways	3	-	-	-

Norris Contracting	4	-	-	-
Northern Transportation	3	-	1	-
Pacific Western Airlines	7	-	-	-
NCPC	26	10	3	-
Radio Station CHAK	2	2	1	2
Reindeer Air Service	1	-	1	-
Wiederman Taxi	3	-	-	-
Gordon Campbell Construction	2	-	-	-
Hostels				
R.C. Hostel	13	4	2	-
Anglican Hostel	6	3	7	-
<hr/>				
Total Wage Employment	320	50	83	36 489

Not included in survey: Royal Canadian Mounted Police, service personnel attached to HMCS Inuvik, religious functionaries excluding nuns and priests serving in the hostels, workers in the Rehabilitation Centre.

A tradition of wage employment among the native population was initiated during the construction of the DEW line sites, and with the construction of Inuvik itself. Unfortunately, neither of these activities is self-sustaining. The not altogether unjustified opinion exists today that many jobs are created in order to absorb a labour force which, with the redundancy of DEW line sites and the completion of major construction in Inuvik, would be largely unemployed.

Wage Employment in Government Service

Among government employees, there are distinct differences in income according to ethnic status. Of all employers, however, government seems most sensitive to this problem. The fact remains that in spite of good intentions, native employees but rarely have skills which would fit them for responsible administrative

posts. Thus, the exclusion of natives from the higher wage brackets is de facto rather than de jure. The fact that native people perform well in a limited number of responsible positions indicates, if indication is indeed necessary, that this is the result of the lack of acquired rather than of innate characteristics.

In Inuvik, 90.3 percent of the (52) Eskimo men on the Department of Northern Affairs payroll, 72.7 percent of the (11) Indian men, and 86.3 percent of the (22) Metis men earned between \$300 and \$350 per month. In comparison, 81.3 percent of the (16) white men on the payroll earned more than this amount. In addition, salary earning civil servants are almost entirely white. Thus, even in the Department of Northern Affairs, although more natives are employed than whites, they generally occupy "prevailing rate" jobs (Table 9).

Table 9--Inuvik Employment, By Income and Ethnic Status, July, 1965

Department of Northern Affairs and National Resources

	Monthly Income ^a											
	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
Permanent Employees												
White	-	-	-	-	1	1	3	-	2	-	1	-
Eskimo	-	-	-	1	15	1	-	-	-	-	1	-
Indian	1	-	-	-	1	1	-	-	-	-	-	-
Other	-	-	-	-	3	4	-	-	-	-	-	-

Table 9--Continued

Temporary Employees											
White	-	-	-	3	2	-	5	-	2	-	-
Eskimo	-	-	2	1	32	-	2	-	-	-	-
Indian	-	-	1	1	7	-	-	-	-	-	-
Other	-	1	1	-	16	-	1	-	-	-	1

Civil Servants											
White	-	-	-	1	1	1	1	1	4	-	11
Eskimo	-	-	-	-	-	-	1	-	-	-	-

^aBased on hourly wage for a 40-hour week. In fact, most employees will work longer than this. Totals exclude northern allowances.

In addition, the security of job tenure is generally greater among whites. In part, this is a function of the nature of the local economy. Many natives wish wage employment only during the months when they are not in their winter camps. The burden imposed by the seasonality of much northern employment is in the main borne by the native employee. Among native wage employees, the number of jobs available and the total earnings are less in the winter months than in the summer. This tendency is if anything more marked in the smaller settlements where much of the employment is in projects (Table 10).

Table 10--Winter and Summer Employment, Department of Northern Affairs and National Resources

	Jan. 1-15, 1965		July 1-15, 1965	
	Number	Earnings (dollars)	Number	Earnings (dollars)
Inuvik				
Eskimos	27	6262	47	10,387
Indians	3	501	10	1,923
Others	27	6740	36	8,011
Aklavik				
Eskimos	4	765	8	1,849
Indians	3	705	23	3,169
Others	2	260	10	2,166
Fort McPherson				
Indians	2	477	7	1,371
Others	-	-	2	190

Source: Department of Northern Affairs, Inuvik.

Of course, as has already been stressed, many natives employed only in the summer months will be engaged in trapping in the winter and will thus have an additional source of income. However, it is clear that income from trapping is almost always very small indeed and thus considerable seasonal adjustment in patterns of consumption must be made by such people.

In government departments other than the Department of Northern Affairs, the bias towards white employment is even

greater (Table 11). Of a total of employees in other government departments, 78.6 percent are white. Once again, natives are generally employed at prevailing rates and thus earn between \$300 and \$350 per month.

Table 11--Inuvik Employment, By Income and Ethnic Status, July, 1965

Government Departments Other than NA&NR^a

	Monthly Income											
	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	-	10	3	14	7	4	5	23	7	3	33	1
Eskimo	3	7	-	1	13	-	-	1	-	-	-	-
Indian	-	9	1	1	7	1	-	-	3	-	1	-
Other	-	1	-	1	1	-	-	-	2	-	-	-

^a Department of Public Works, Department of National Health and Welfare, Department of National Defence (excluding service personnel), Inuvik, Research Laboratory, Northern Canada Power Commission.

School Hostels^b

White	-	-	1	-	1	-	-	6	1	4	5	1
Eskimo	-	-	-	6	-	2	-	1	-	-	-	-
Indian	-	-	-	5	-	1	-	1	-	-	-	-
Other	-	-	-	1	-	-	-	-	-	-	-	-

^b Including priests, nuns, and ministers working in the hostels.

The Private Sector

A similar bias is apparent in the private sector, although the reasons given for not employing native people are generally quite specific. Many employers would seem to be prejudiced against

employing natives by unfortunate experience in the past. Since their operations are somewhat marginal,¹ they cannot afford to take risks with employees whom they consider unreliable. Thus they will show a preference to recruit workers from the fairly sizeable pool of employable whites in Inuvik. This pool is in the main made up of wives of government employees and service personnel, but includes also a few servicemen who wish to make extra income by "moonlighting".

In fairness to the local entrepreneur, it must be noted that the turnover in native employees is marked--a fact which may give some substance to the claim of unreliability. In Tuktoyaktuk, where available employment is limited in any case, the local Community Association has taken some initiative in preparing a list of available (and by implication "reliable") workers which it plans to circulate among local employers. This is a step which may well be recommended for Delta settlements. Although no definite evidence can be presented at this stage, the impression remains that there are several skilled and reliable workers in Inuvik who would wish to be permanently employed but are unable to find jobs because their good reputations are not well known to potential employers.

It is often claimed that young native girls are particularly undependable. Of course, many teenage girls only recently out of

¹ Based on credit ratings given in the Dun and Bradstreet directory.

school are by no means committed to a wage-earning career. It is no surprise that this group in particular only hold down a job for a few months.

Even among other groups, employment presents a fairly fluid picture. The fact that certain jobs exist is no indication that they are occupied by the same individuals during the course of a year, or even a period of only a few months. A deficiency of the present survey is that it has made no attempt to link specific jobs with specific individuals. Further evidence would be required to assess the validity of the fairly widespread belief that the native works for wages to fulfil immediate needs, and quits his job when these needs are fulfilled. Specifically, rigorous comparison of the reasons given by both the employer and the employee for an individual's leaving his job would be helpful in this respect.

Table 12--Inuvik Employment, By Income and Ethnic Status, July, 1965

Service Industries^a

	Monthly Income											
	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	-	4	1	5	-	-	2	-	3	1	11	4
Eskimo	--	1	-	-	-	-	-	-	2	1	-	-
Indian	-	3	-	-	-	-	-	-	-	3	-	-
Other	-	2	-	-	-	-	-	-	-	1	-	1

Barber Shop and Beauty Salon, Canadian Imperial Bank of Commerce, Imperial Oil, Inuvik Development Corporation, Mackenzie Hotel, Tuk Traders, Laundry. Retail Stores (i.e. Hudson's Bay Company, F.L. Semmler, and Territorial Liquor Commission) are excluded.

Other Non-Government Industries^b

	Under 250		250-300		300-350		350-400		400-450		Over 450	
White	-	-	-	-	1	-	--	1	5	-	12	1
Eskimo	-	-	-	-	1	-	-	-	1	-	2	-
Indian	-	-	-	-	-	1	1	-	-	-	-	-
Other	-	-	-	-	-	1	1	-	1	-	-	-

^b Douglas Trucking, Great Northern Airways, Northern Transportation, Pacific Western Airlines, Radio Station CHAK, Reindeer Air Service, Gordon Campbell Construction.

The attitudes of private employers tell a great deal about the present and potential economic development of the region. It is possible that these attitudes conform to a typology of the entrepreneurial group itself. A tentative division may be made between the "old-timers" and the "newcomers". The former generally entered the area as trappers, and during the course of long careers in the North have attempted activities ranging from mink-ranching to coal-mining. In general, their attitudes seem to be more conservative than would be expected by the evidence of their past enterprise. They seem as a group more aware of their dependence on government activity than the newcomers.

Although substantial incomes were to be made from private enterprise in the past in this region, opportunities are undoubtedly decreasing (or what is perhaps more important, appear to those concerned to be decreasing) as government assumes a greater role in the region's economy. Many of the older members of the entrepreneurial

group express the view that their function has been usurped by government activity, or their enterprise hindered by government restrictions. In a few cases this view is justified. An example may be taken of the local contractor who developed a coal mine northwest of Aklavik during a period of about twenty years, only to find that his sole market disappeared due to a government decision to install oil burning furnaces in the building he supplied. What is important here is not whether this or any other action on the part of government may be defended or criticized, but that it has induced willy-nilly some fairly consistent attitudes on the part of many who in the past saw themselves as controlling to a large degree the economy of the region.

The impression is widespread among this group that government could stimulate private enterprise in the region by, for example, encouraging the use of local retail activities by government employees from outside, awarding contracts locally for hauling gravel and lumber rather than using government facilities, or by removing restrictions which tend to discourage investment. In all cases, individual initiative seems to have been watered down by a feeling that success is only possible with government blessing.

It should be said that the entrepreneurs who hold these views are generally long established in the area and fairly traditional in their business attitudes. The newcomers, on the other hand,

represent a class of business activity which has developed concurrently with growing government interest in the area. These people seem (with some qualifications) to accept and indeed welcome the role of government. They have evidently profited from the fact that less capital investment is required to start a business in the North than is required outside. In addition, business methods have not necessarily to be as aggressive as those which would guarantee success outside.

Inuvik in Comparison with the Other Settlements

The newcomers are more apparent in Inuvik than in the other settlements for just as the growth of government activity has been greatest here, so also has the growth of the entrepreneurial sector.

The structure of the wage economy in Inuvik may attract criticism on the grounds that (a) it emphasizes the service activities which do not contribute to the settlement's potential economic growth, and (b) that it favours white employees in the higher paid occupations. However, it is unlikely that had Inuvik not come into existence the opportunities for wage employment would have expanded to their present degree.

Of the employment opportunities survey (Table 13), 54 percent are at present occupied by whites. Of these, 36 persons are in occupations for which the income exceeds \$450 per month. Eskimos are employed in 24 percent of the available jobs (men, 18

percent and women, 6 percent), and Indians in 12 percent (men, 5 percent and women, 7 percent). Of these jobs, the greater number by far command a monthly income between \$300 and \$350 per month.

Table 13--Inuvik Employment^a--By Income and Ethnic Status,
July, 1965

	Monthly Income											
	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	-	14	5	23	13	6	16	31	24	8	73	8
Eskimo	3	8	2	9	61	3	3	2	3	1	3	-
Indian	1	12	2	7	14	4	1	1	3	3	1	-
Other	-	4	1	2	20	5	2	-	3	1	1	1

^aDepartment of Northern Affairs (excluding teachers), Inuvik Research Laboratory, Department of Public Works, Department of National Health and Welfare, Department of National Defence (excluding service personnel), Barber Shop and Beauty Salon, Canadian Imperial Bank of Commerce, Imperial Oil, Inuvik Development Corporation, Mackenzie Hotel, Tuk Traders, Government Laundry, Douglas Trucking, Great Northern Airways, Northern Transportation, Pacific Western Airlines, Northern Canada Power Commission, Radio Station CHAK, Reindeer Air Service, Gordon Campbell Construction, R.C. Hostel, Anglican Hostel.

It is to be expected that as the amount of training received by native peoples increases the necessity of importing skilled workers from outside will diminish. Natives should be expected to move in increasing numbers into the higher paid occupations at present filled by whites from outside.

The discontinuity between high-paid jobs occupied by whites and low-paid jobs occupied by natives is more apparent in the smaller settlements than in Inuvik. In Aklavik in particular, virtually

WAGE EMPLOYMENT, BY INCOME & ETHNIC STATUS

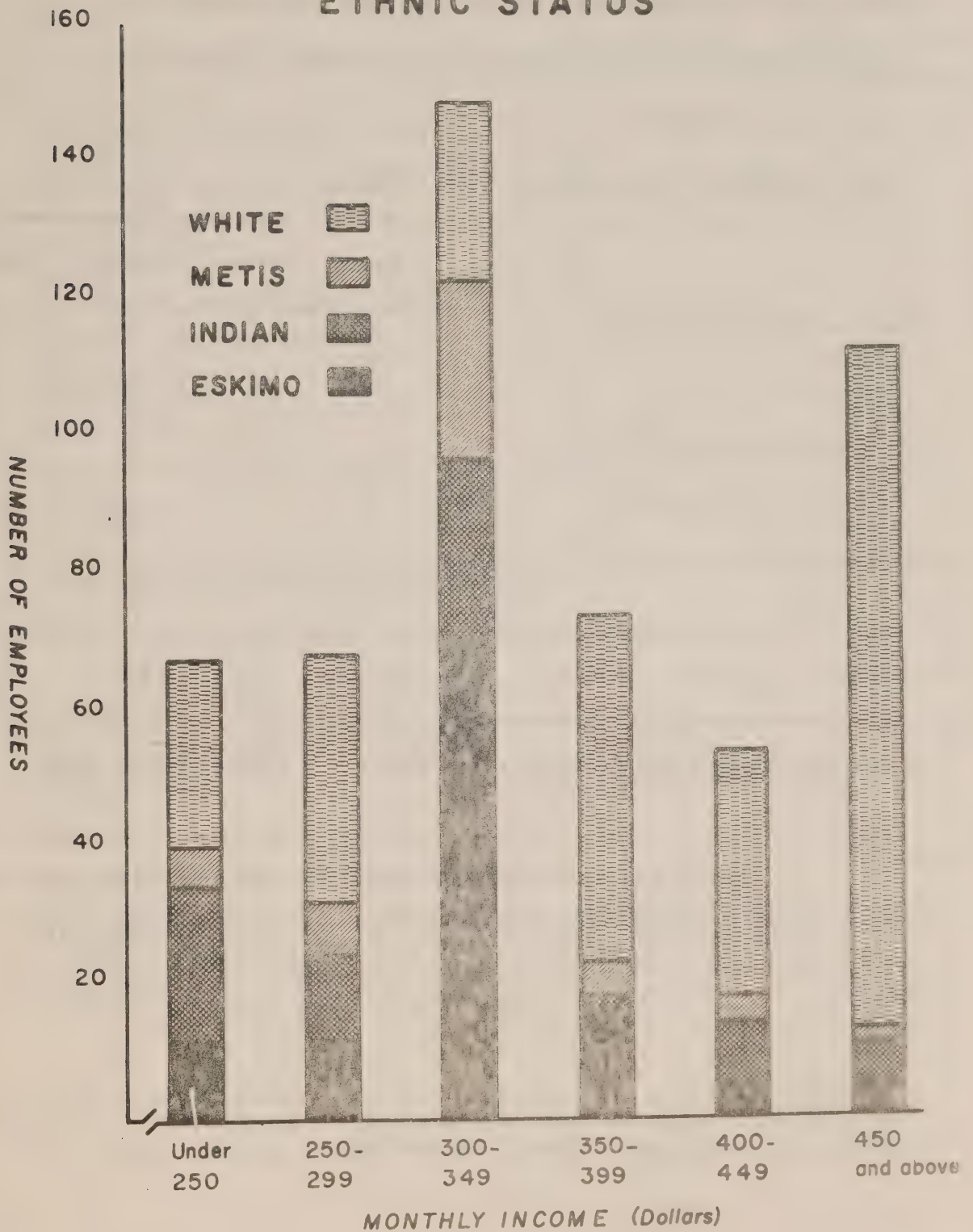


Fig. 4

all the higher income jobs are occupied by whites, and virtually all the lower income jobs by natives. In Fort McPherson, in slight contrast, five Indian people are in jobs with a monthly income exceeding \$450.

Table 14--Aklavik Employment, July, 1965

	White	Indian	Eskimo	Other
Dept. of Northern Affairs	2	3	6	1
School	6	-	-	-
Sawmill	1	4	4	1
NCPC	2	-	3	-
National Health and Welfare	2	-	3	-
RCMP	3	-	1	-
Hudson's Bay Company	4	-	-	1
Peffer's Store	1	-	1	-
Imperial Oil	1	-	-	-
Restaurant	1	-	3	-
Total	23	7	19	3

Table 15--Aklavik Employment^a, By Income and Ethnic Status, July, 1965

	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	-	-	-	-	-	-	1	-	-	-	5	2
Eskimo	-	1	-	1	6	-	5	-	1	-	2	-
Indian	-	-	1	1	5	-	-	-	-	-	-	-
Other	-	-	1	-	-	-	-	-	-	-	1	-

^aDepartment of Northern Affairs (excluding teachers), NCPC, Department of National Health and Welfare, Peffer's Store, Imperial Oil.

Table 16--Fort McPherson Employment, July, 1965

	White	Indian	Eskimo	Other
Northern Canada Power Comm.	6	8	-	2
Dept. of Northern Affairs	8 ^a	-	-	1
Citizenship and Immigration	1	1	-	-
National Health and Welfare	1	1	-	-
Game Branch	1	1	-	-
RCMP	2	-	-	-
Fleming Hall (Anglican)	4	8	-	1
Hudson's Bay Company	2	3	-	-
Roy Wright	3	-	-	-
Alex Forman	1	1	-	-
Mike Krutko	1	2	-	-
Total	30	25	-	4
^a Teachers				

Table 17--Fort McPherson Employment^a, By Income and Ethnic Status,
July, 1965

	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	-	-	-	-	1	1	-	1	2	-	9	1
Indian	-	9	-	1	3	1	-	-	3	-	5	-
Metis	-	-	1	-	-	-	1	-	-	-	-	-

^a Northern Canada Power Commission, Department of Northern Affairs (exc. teachers and including Game Branch), Department of Citizenship and Immigration, Department of National Health and Welfare, Fleming Hall, A.D. Forman, M. Krutko.

Table 18--Delta Settlements Employment^a, July, 1965

	Monthly Income											
	Under 250		250-300		300-350		350-400		400-450		Over 450	
	M	F	M	F	M	F	M	F	M	F	M	F
White	9	18	10	26	14	7	19	32	28	8	89	11
Eskimo	3	9	2	10	67	3	14	2	4	1	5	-
Indian	1	21	3	9	22	5	1	1	6	3	6	-
Other	-	6	4	4	20	5	5	-	3	1	1	1
Totals	13	54	19	49	123	20	39	35	41	13	101	12

^a Inuvik, Aklavik, Reindeer Station, Fort McPherson, Arctic Red River. Excluded are service personnel of HMCS Inuvik, RCMP officers and special constables, teachers with Department of Northern Affairs and National Resources, Religious functionaries apart from those serving in student hostels. Also excluded, due to lack of data, were Department of Transport, Department of Citizenship and Immigration, F.L. Semmler, Territorial Liquor Commission, Norris Contracting, Weiderman Taxi, Mackenzie Delta Construction, Inuvik Painting and Decorating (all in Inuvik); Roy Wright (Ft. McPherson); recently opened restaurant (Aklavik).

The opportunities for wage employment are fewer in the smaller settlements than in Inuvik. As a result, many of the more ambitious or better skilled workers have either moved to Inuvik permanently, or move there temporarily for the summer months. In Fort McPherson and Aklavik, a few men have been able to obtain jobs recently with oil companies carrying out exploratory activities in the Delta and adjacent areas. Two men from Fort McPherson have obtained such jobs on a permanent basis, but for the most part this work has been very irregular. The major oil companies were polled as part of the survey on which this report is based, but none had employed Delta people for other than casual work, nor saw the possibility of doing so in the future.

Other employment is available in the smaller settlements in winter work programmes and in guiding.

In Fort McPherson for example, 16 men were employed in the winter of 1964-65 in building a winter road to Arctic Red River, 31 in logging projects, 13 in building an ice bridge across the Peel River, and 25 in miscellaneous winter projects of the Indian Affairs Branch. The total earnings from all these projects were small however, with the result that the men employed had to seek other employment or subsist on welfare payments. In addition, the small amounts of capital invested in some winter projects (in particular the winter road to Arctic Red River) resulted in the work being inadequately performed.

In Aklavik, some work was available for women in the Fur Garment Co-operative, but due to management difficulties this has since temporarily ceased to operate.

Local guiding has offered few opportunities at present, although about 30 guides from the Delta have been employed in Great Bear Lake during the summer months. The training of guides would of course be a suitable prerequisite for any expansion of the tourist industry which takes place.

However, casual or seasonal work of this kind carries with it the disadvantages that it neither provides sufficient income for year round subsistence, nor conditions the employee to accept eventual permanent wage employment. Unfortunately, this has been

the pattern of employment for many Delta people up until the present time. As a result, many have accepted a partial commitment to wage employment and have relinquished traditional patterns of living off the land. The resulting gap between the earnings of these people and their annual requirements for subsistence must be met out of welfare payments. In the first six months of this year, (1965) welfare payments totalled about 90,000 dollars from all sources in the Delta settlements.

FREIGHT MOVEMENTS

The costs of freighting materials into the Mackenzie Delta will provide a barrier to development in the foreseeable future. In many ways, the region is more fortunate in this respect than other parts of the North in that the Mackenzie River provides the means of bringing freight into the region fairly cheaply during the summer months.

There is of course a great discrepancy between amounts of north-bound and south-bound freight on the river. In 1964, a total of 29,698 tons of freight was imported into Mackenzie Delta ports including Tuktoyaktuk (Table 19). Of this, 53 percent was unloaded at Inuvik, 5 percent at Aklavik, 7 percent at Fort McPherson, and 6 percent at Arctic Red River. The remainder went on to Tuktoyaktuk, much of it to be unloaded on to boats serving the Arctic coast. In contrast, 685 tons of freight were shipped south in 1964, 27 percent from Inuvik, 13 percent from

Fort McPherson¹ and 19 percent from Arctic Red River, and the remainder from Tuktoyaktuk and Aklavik.

In 1965, 29, 69 tons of freight were imported into the Delta ports, 65 percent to Inuvik, 7 percent to Aklavik, 13 percent to Fort McPherson, and 8 percent to Arctic Red River (Table 19). Again, only 795 tons were shipped south, 23 percent from Inuvik, 35 percent from Fort McPherson, and 29 percent from Arctic Red River.

Table 19--Freight Shipped into Mackenzie Delta by Barge, 1964 and 1965 (in tons)

To-	1964				
	Inuvik	Aklavik	Tuk	Arctic Red	McPherson
Refrigerated Goods	328	33	-	3	57
Oil Products	11,327	1,136	1,558	1,254	3,696
Building Materials and other freight	4,009	321	571	608	4,797
1964 Total	15,664	1,490	2,129	1,865	8,550
1965					
Refrigerated Goods	228	26	10	4	50
Oil Products	14,861	1,456	1,598	1,744	2,220
Building Materials and other freight	4,185	572	621	565	1,729
1965 Total	19,274	2,054	2,229	2,313	3,999

Source: per. comm. D.S. Robinson, Northern Transportation Co. Ltd.

The discrepancy between incoming and outgoing freight of course results in higher freight rates, since the carrier has to bear most of the costs of the return trip.

1. Much of this is accounted for by a drill rig shipped to Fort McPherson from Hay River.

The greater proportion of incoming freight consists of oil and oil products from Norman Wells. In Inuvik in 1965 72 percent of the incoming freight was oil, 76 percent in Aklavik, 43 percent in Fort McPherson, and 67 percent in Arctic Red River. Oil forms the major fuel input of the Delta settlements, although in Fort McPherson in particular most of domestic heating is from wood-burning stoves. Electrical energy is also derived almost entirely from deisel generators, although once again in Fort McPherson at least one domestic wind-generator is in use.

Refrigerated goods are also shipped into the Delta by barge and in this case, no return freight is possible. The expansion of the Reindeer Project and the introduction of commercial fishing would of course provide return cargo for refrigerated barges.

Most outgoing freight consists of equipment being sent out for repairs, personal effects of personnel returning south and empty oil drums to Norman Wells.

Inuvik is served by three scheduled flights per week from Edmonton by commercial aircraft, together with some privately chartered flights and service aircraft. The smaller settlements are served by feeder services originating out of Inuvik.

By far the greatest amounts of air freight are bound for Inuvik itself. Inuvik received 88 percent of the total freight entering the region in 1964-65 (Table 20). Amounts of air freight

reach a peak in the winter months when barge services are not available. In the summer months, when air freight is less, the number of passengers carried is, of course, greater.

As in the case of water-borne freight, outbound freight is much smaller in quantity than inbound (Table 21), which once more results in the carrier having to meet the costs of the return trip with higher rates than would be possible were amounts of ingoing and outgoing freight more equal.

Table 20--Freight Carried on PWA Scheduled Flights to Inuvik
(in lbs.), June 1, 1964-May 30, 1965.

Month	Destination					Total
	Inuvik	Aklavik	Fort McPherson	Arctic Red River	Tuktoyaktuk	
June	59,402	1,673	1,129	97	-	62,301
July	54,340	1,747	775	70	-	56,980
August	56,482	2,820	1,408	95	-	60,805
September	52,790	2,223	3,109	-	1,097	59,219
October	58,041	3,195	2,042	112	1,623	65,013
November	62,402	3,192	6,755	103	2,773	75,225
December	85,484	5,226	4,479	2,029	3,362	100,580
January	70,683	7,540	1,651	24	2,689	82,587
February	74,425	4,812	3,467	592	3,374	86,670
March	76,035	4,145	2,947	46	4,085	87,257
April	83,895	4,215	4,429	41	6,455	99,035
May	86,564	1,667	799	-	2,852	91,882
Year	820,543	42,455	32,989	3,209	28,358	927,554

Source: Telex messages describing each flight leaving Norman Wells.

Table 21--Air Freight from Inuvik (lbs.), 1964

	Destination					
	Edmonton ^a	Aklavik	Fort McPherson	Arctic Red River	Tuktoyaktuk	Others ^b
January	4,819	1,473	723	598	285	1,433
February	4,736	1,406	3,038	111	118	1,215
March	3,897	741	711	66	687	1,044
April	5,762	759	777	161	174	823
May	8,026	1,023	329	476	680	2,796
June	15,851	967	1,203	28	47	897
July	19,043	1,245	1,505	532	923	2,243
August	28,872	3,053	1,014	57	396	2,707
September	11,263	1,296	937	699	1,926	2,723
October	8,323	907	828	83	732*	2,911
November	5,516	2,891	570	135	1,292	3,674
December	6,920	2,110	1,216	154	1,548	2,811
Year	123,028	17,871	12,851	3,100	8,808	25,277

Source: Freight Manifests held by Inuvik office of Pacific Western Airlines.

^aPoints outside the Mackenzie District via Edmonton.

^bOther points in the Mackenzie District.

CONCLUSIONS

The Economy of the Mackenzie Delta

It is apparent that the resource base of the Mackenzie Delta is insufficient to support the present population. The region is not however unique in this respect. Many other parts of Canada experience the same problems, but elsewhere, the remedy may be sought through out-migration. In the Mackenzie Delta constraints are placed upon out-migration by the relative isolation of the area and the necessity for cultural adaption which must precede a move to the south. The decision to leave the Delta for Edmonton involves a greater range of variables even than that to leave a Newfoundland outport for Toronto. The fact that many Delta people have successfully accomplished this transition augurs well for the future, especially since the younger people are on the whole better able to make the adjustment than their parents. It has often been said that the problem generation of the North is that which comprises those young enough to be affected by the impact of the southern socioeconomic system, but too old to have been prepared for this impact by a training based upon the southern value system. It is likely that the economic well-being of this generation at least must be based upon the patterns of exploitation of local resources to which they are accustomed.

The resources which have been exploited to date are characterized by (1) an extensive distribution, and (2) their generally marginal character.

The exploitation either for cash income or for subsistence, of fur-bearers, game, fish, and forest resources demands a population distribution which is both dispersed, and experiences major seasonal adjustments. Different locations are required for the exploitation of caribou, of fish, and of the muskrat. If a trapper has the equipment and the skill to trap for fine furs he must often be prepared to be away from his family for several months. In contrast to the demands imposed by the geographical distribution of resources, forces of population concentration have been active to a greater or lesser degree for the past fifty years at least. Until fairly recently, these have been insufficiently persuasive to encourage large numbers of people to reside permanently in the settlements. Even a decade ago, a large portion of the native population was evenly dispersed throughout the Delta during the winter months. The economic inducements to maintain trapping camps have since declined, while centripetal forces have seemingly increased in intensity. Schools, hospitals, movie theatres, beverage rooms, and other urban amenities exercise a strong inducement for the individual to remain in the settlement. In contrast, the arguments for living "on the land" seem flimsy.

The income to be expected from trading furs has declined in recent years both for the individual and for the region as a whole. In the 1964-65 season, the value of furs traded into the settlements

was in the neighbourhood of 160,000 dollars¹ by some 390 individuals.

Although there may be some small hope that a small group of professional trappers will continue to harvest the furs of the Delta, it is unlikely that this sector of the economy will ever regain its former stature.

The harvesting of furs formed the keystone in a human eco-system which persists to the present. Successful trapping is intimately associated with the use of the other local resources of fish, used as food for both dogs and people, and wood, used for fuel and building materials.

For the people who cannot hope to derive sufficient income from trapping, two alternatives present themselves.

1. Either they may maintain the seasonal movements originally based upon the trapping economy, but with an emphasis which has shifted from harvesting furs for cash income to harvesting fish and game for subsistence, or
2. they may take up permanent residence in the settlements and, if unable (or unwilling) to find employment, subsist on welfare payments.

In fact, many people compromise between these two alternatives by staying in the settlement for much of the time, but spending some weeks on the land, trapping, fishing, or hunting in a rather haphazard fashion.

¹ Some of this amount was accounted for by furs traded into Inuvik from Sachs Harbour. (9,842 dollars, pers. comm., P. Usher).

The tendency in recent years has thus been for the number of people living permanently in the settlements to increase. In some cases this has given rise to extreme pressure on available housing and resulted in the growth of shack towns. Perhaps the worst example of this development is found in Inuvik's "tent town", which had, however, decreased in size somewhat by 1965.

Significantly, the population of the settlements has altered little since the construction of Inuvik (Tables 22 and 23). Thus the number of people living in settlements represented by the Inuvik population is accounted for by the excess of births over deaths, but also by people moving off the land.

Table 22--Population in the Settlements, 1956-58

Settlement	White	Metis	Eskimo	Indian	Total
Aklavik (1958)	560		c250	c170	c980
Reindeer Station (1958)	14	-	61	-	75
Fort McPherson (1956)	29	36	-	400	465
Arctic Red River (1956)	10	13	-	85	108

Source: Dept. of Nat. Health and Welfare, Edmonton.

The net increase of population, it must be noted, is higher in the native sector than the Canadian Average (6-9 percent compared with 2 percent). However, even taking this source of increase into account, it is apparent that the centripetal forces have exceeded the centrifugal forces in the Delta.

Table 23--Population in the Settlements, 1965

Settlement	White	Metis	Eskimo	Indian	Total
Inuvik ^a	1367		646	245	2264
(Hostel)	(102)		(270)	(114)	(486)
Aklavik	105	134	277	158	674
Reindeer Station	9	-	60	-	69
Fort McPherson	29	158	12	315	514
Arctic Red River	5	21	-	83	110

^a Including children living in the hostels, but excluding single navy men living in barracks.

Thus, regional planning must almost inevitably seek to strengthen the economic base of the settlements, since this is evidently where the greater number of people prefer to live.

Supplying the Needs of the Settlements from Local Resources

There is no doubt that the costs of maintaining the settlements, which are largely met from Federal funds, could be reduced by supplying more of their needs from local resources.

Two possibilities exist for the future.

1. The exploitation of local food resources may be reoriented from a subsistence to a cash economy in order to supply the needs of the increasing numbers of persons living in the settlements. This reorientation would of course provide an additional source of cash income for those continuing to live on the land. At present, this shift of emphasis is exhibited on a limited scale as, for example, when traders purchase fish from local fishermen for resale.

2. Local needs for building materials may be met increasingly from the expansion of the forest industry.

At present, the low standards of living prevailing in the settlements are, in part at least, a function of the high costs of living. Amelioration of living conditions would be produced by a reduction in, for example, food costs, either by the application of direct subsidies, by the subsidization of transport costs, or by a greater emphasis upon locally produced foods.

Continued Resource Exploitation

These measures are of course dependent upon the continued exploitation of the slim resource base. Two concomitant problems have been experienced in this context to the present time.

1. Too many people have been occupied in exploiting local resources and, as a result, only very few have been able to make an adequate income from doing so. It is true certainly that fishing, hunting, and trapping are labour-intensive activities but they could probably yield greater returns for less effort were they engaged in by fewer people.
2. Activities based upon the use of local resources are seasonal. Some attempts have been made recently to fill the gaps in the annual cycle of activities in order to provide income in otherwise slack periods. The Forestry Projects currently in operation is an example of this, and commercial fishing may be regarded in this way also.

In government sponsored activities, it is often not clear whether the natural or human resource is to be developed. Thus, conflicts arise as to whether a particular industry's primary function is to provide economic support for the families of those it employs, or to make a profit. Unfortunately, the marginal nature of industrial activity in the North usually precludes the possibility of doing both.

Commercial fishing perhaps holds more promise of both providing economic support for Delta families while operating on a profit making basis. However, this development must at present be viewed with some caution.

1. The U.S. markets may be penetrated only with the co-operation of the U.S. fish marketing organizations. Access to these markets may well be a necessary prerequisite to commercial fishing in the Mackenzie Delta.
2. A danger exists that local fishermen would soon find themselves overly dependent upon commercial fishermen, should these enter the region. The dispersed nature of the local fisheries would demand that the commercial fishermen purchase fish from local people, who may well trade fish which they would otherwise require for their own use. Given the ever-present tendency for cash income to be dissipated in ways which produce no permanent improvement in the economic well-being of the individual, it is possible that transactions of this kind could have ill effects on those engaging in them.

The Energy Resources of the Delta

Paradoxically, the greatest potential for development in the Delta lies in its energy resources. Oil and natural gas are likely to occur in the region, and even the Mackenzie River represents a source of energy which elsewhere would undoubtedly be harnessed. While in the south, energy resources provide a sound basis for economic development, it is not likely that they will do so in the Delta. Processing oil products in situ, for example, might well prove uneconomic. If exploitation of these resources does take place it is more likely that it will result in their export from the region in crude form either by pipeline or by water.

FUTURE RESEARCH DIRECTIONS

Future research should seek to analyse the natural and human resources of the Mackenzie Delta, and the potential interaction between them. Research which has an implicit predictive quality will evidently be of greater use in the determination of policy directions than that which has purely academic aims. However, since relatively little is known of the human resources in particular of the Mackenzie Delta, some empirically derived framework should form an essential prelude to predictive work.

Research of this kind will be concerned above all with the present human ecology of the region and with its potential for change. The region has within two generations been subject to external economic stimuli -- the whaling and trapping economies for example -- which have brought about profound readjustments in the ways of life of its people. A greater understanding of the specific ways in which these readjustments have taken place in the past will lead to a more rational appreciation of the capacity for change of the area's population, and will enable those sectors in which change is most likely to occur to be identified.

Economic Growth

Since the region contains little significant self-generating economic activity, its economic growth will be entirely dependent, at least initially, upon capital inputs from outside. Unfortunately, the nature of the resource base has not encouraged

such inputs by the private sector in the past, since both whaling and trapping were essentially exploitive activities which did not require a complex economic infrastructure. Thus, capital inputs have derived almost entirely from the government sector and have been directed largely towards the strategic and administrative establishments.

It is impossible to view economic growth in the Mackenzie Delta outside of the context of economic policy for Canada as a whole. It is thus relevant to consider the goals stated by the Economic Council regarding the reduction of regional disparities.

As stated in the Council's Second Annual Review:

There are . . . two main inter-related considerations involved in moving towards a better regional balance. The first is the importance of reducing the relative disparities in average levels of income as they presently exist among the regions . . . The second consideration is the need to assure that each region contributes to total national output, and to the sustained long-run growth of that output, on the basis of the fullest and most efficient use of the human and material resources available to the region (Economic Council of Canada 1965: 98-99).

The human and material resources of the Mackenzie Delta have not to the present been put to their fullest and most efficient use due to both environmental and cultural constraints.

Environmental Constraints

The environmental constraints do not require detailed description since they have been fully documented elsewhere (Mackay 1963).

Further research into the physical landscape will contribute to the solution of remaining problems concerning construction techniques in permafrost (Muller 1945),¹ and of floral and faunal adjustments to an Arctic environment. Although studies of this nature will continue to be of use in the solution of specific local problems, they are unlikely to present startling alternatives of large scale regional development.

Broadly, the characteristics of the physical environment are sufficiently well understood at present for the constraints they impose upon economic growth to be identified. These would include;

1. The high cost of construction in permafrost areas and the difficulties involved in constructing and maintaining roads;
2. The unlikelihood of fostering a large-scale forestry program in an area where an extremely short growing season inhibits the rapid growth of conifers;
3. The difficulty of servicing a population which is dispersed, in part because of the past and present patterns of resource exploitation; and
4. The isolation of the region from the mainstream of Canadian economic activity and the consequent high cost of supplying materials from the South.

1. Intelligence Division, August, 1945. This represents¹ an early statement of the problem, based upon reports of research conducted in the USSR. Specific information on Mackenzie Delta locations is provided in the Terrain Site Analyses of the Department of Mines and Technical Services.

Cultural Constraints and Cultural Research

The rate of regional economic progress will depend in large measure upon the view the region's people have of their physical and social environment.

In this context a purely ethnic differentiation of the population has decreasing relevance. The distinctions between White, Eskimo, Indian and Metis people is of less importance in the economic context than those between what could be called the native and non-native sectors. The native sector would include members of all ethnic groups who were born in the region or in other northern regions, and whose style of life is related to a greater or lesser extent to the northern environment.

The non-native sector would include those who have entered the region from outside, and whose style of life is not very dissimilar from that of the southern Canadian.

With regard to future growth, two alternatives would seem to be possible. Either the major decision-making processes will fall increasingly into the hands of the non-native group resulting in the native group assuming an economically subservient and unproductive role: or the native group will be able to adjust sufficiently to the demands of a more complex socio-economic situation and itself assume the decision-making role.

Within these two major divisions of the population, a more complex typology can almost certainly be recognized. Indeed it should be an aim of future research to identify the elements of this typology in quantitative terms. Cultural differentiation among the population produces problems in predicting the response to economic stimuli, since this response is always conditioned by the perception the individual has of his physical and cultural environment.

It is upon the contents of a decision-maker's mind that both his manner of sizing up his environment, and his subsequent response depends. He does not respond to an environment as such. Instead he responds to his image of that environment, to an image that is conditioned by his map of the somewhat larger and more inclusive but seemingly relevant world (Spengler 1961).

The varying perceptions that the people of the Delta hold of their region and of the wider universe of which it is a part have undoubtedly resulted in much confusion and misunderstanding. To be specific, different sectors of the population have views on such matters as welfare payments, the role of the Department of Northern Affairs, the purposes of education, etc., which are completely at variance.

Future research should attempt to solve these problems in a clearly defined sequence as follows:

1. The identification of the main cultural groupings.

The resulting typology would be based upon the life-styles and degrees of acculturation exhibited rather than on the basis of ascribed ethnic identity.

2. The analysis of the perception of the physical and cultural environment held by each subgroup within the typology.

The stated attitude of members of each subgroup may contribute to this analysis, as would also the ecological pattern exhibited by each subgroup.

Predictive economic models will only have meaning when seen in the context of the cultural framework. Thus, the identification of the diverse elements of the region's cultural matrix must precede, or at least accompany, the formulation of policies related to economic growth.

Establishing Goals

In the past, goals have not always been clearly established. The failure to distinguish between economic and social goals has bedevilled both the Reindeer Project and the Forestry Project, to name two examples.

Long range economic goals as opposed to day to day administrative procedures, have in the past and will in the foreseeable future, be set up by external decision-makers in the government or private sectors. That this is a source of frustration for local people is unfortunate, but perhaps inevitable, since it is in some measure the result of the workings of an established chain of authority which is likely

to persist. Advantage may however lie in this fact, since external decision-makers may be able to maintain a degree of objectivity impossible for those more closely involved in the region's economy.

In essence, goals for the region could include the following alternatives:

1. Goals related to a fully integrated and self-sufficient economic growth as advocated by the Economical Council (Economic Council of Canada, 1965). It should be recognized from the outset that the economic base of the region as it is known at present is probably insufficient to support growth of this kind. Few resources exist in the region which would generate capital sufficient for the stimulation of new economic activity.

2. Goals related to population movement
Given the slim resource base, out-migration might be encouraged as a long-term policy. Since this is a policy which has been advocated fairly recently (D. Jenness 1964), it may be worth examining in more detail. Essentially, a policy of this kind would depend upon (a) an educational programme which would prepare young people for easy¹ assimilation into the wider Canadian community, (b) the reduction of the influence of geographic barriers in the form of reduced air fares in order to encourage more frequent contact

with the "outside," and (c) an adult training programme related to the employment needs of Canada as a whole rather than to those of the North.

With regard to the last mentioned factor, it may be necessary to view the resource base in a changed light. For example, although a viable forest industry is unlikely in the region, it may be possible to regard forest exploitation as a vehicle for vocational adaptation.

3. Goals related to social health

Some attempt has been made to achieve goals of this kind. Certainly, the public conscience is more easily stirred by evidence of social than of economic ills. Unfortunately, the remedies used often have the effect of obscuring rather than relieving root causes. For example, the policy of equalizing incomes in the form of welfare payments is unlikely to result in real social gains.

Descriptive and Predictive Models

Once goals have been established at least in general terms, it may be possible to predict the directions of economic growth. The following may be mentioned as examples of regional analysis techniques which have achieved a degree of acceptance.

1. Regional Input-Output Analysis

In this technique, a matrix of regional inputs and outputs is constructed. This may be used as a descriptive device which records the relevant information pertaining to the region's economy and reveals gaps in data. More significantly, the input-output approach offers a technique for projection (Isard 1960).

2. Linear Programming

This represents a model in which economic growth policy may be represented by a set of relationships between dependent and independent variables. Some function of the dependent variable (e.g. regional output) may be maximized subject to known constraints placed on other variables.

The assumption of a closed system reduces the applicability of this type of model in its simplest form where fluctuating capital inputs are received from outside the system as the result of (a) external administrative policies, or (b) interregional trading relationships.

In some ways it would be preferable to regard the Mackenzie Delta as a subsystem within the Canadian Economy, or at least within the economy of the Mackenzie District. A refinement of the linear programming model has been suggested (Rahman 1963) in which capital inputs from a more

productive sub-region (e.g. Yellowknife-Hay River) are allowed to stimulate economic growth within a less productive region (e.g. the Mackenzie Delta).

3. Regional Accounts

Techniques which consider social as well as economic benefits may be described as benefit-cost analysis. It is possible to consider benefits and costs using techniques known as "regional accounting" (Hochwald 1961). Such techniques provide the rigorous framework required for the evaluation of the effects which may be expected from capital inputs from various sources upon the region's social and economic development. Two approaches are possible (Hoover & Chinitz 1961) -- the horizontal and the vertical -- of which the latter would appear to be more suited to the analysis of the Mackenzie Delta. In this approach, "events or influences emanating from the outside world (are regarded) as exogenous (and the approach) merely seeks to provide a mechanism for evaluating the internal impact of certain types of event that may be assumed to occur" (ibid). Prediction may thus be made upon the basis of such varied elements as altered welfare administration procedures, the impact of an oil and natural gas exploitation economy, changes in the pricing and/or marketing procedures of furs, etc.

Conclusions

To recapitulate at this point, future research related to policy should follow a sequence of clearly defined procedures.

1. An empirically derived description of the resource utilization of the region, related to human ecological patterns both at present and in the immediate past, in order to assess the dimensions of change.
2. The formulation or identification of broad policy guide lines defining the long range goals of regional development in terms of economic and/or social needs, accompanied by,
3. The quantitative description of the present economy of the region by some model in which social and economic events are systematically related and by which predictions may be made.

REFERENCES

1. Black, W.A.
1959 A Suggested Programme of Rehabilitation in the Mackenzie Delta Area. Unpublished Manuscript. Canada. Department of Mines and Technical Surveys. Geographical Branch. Ottawa.

1961 Fur Trapping in the Mackenzie River Delta. Geographical Bulletin, no. 16:62-85.
2. Economic Council of Canada.
1965 Towards Sustained and Balanced Economic Growth: Second Annual Review Economic Council of Canada. Ottawa, Queen's Printer.
3. Ferguson, J.D.
1961 The Human Ecology and Social Economic Change in the Community of Tuktoyaktuk, N.W.T. Canada. Department of Northern Affairs and National Resources. Northern Co-ordination and Research Centre. NCRC-61-2. Ottawa.
4. Henoch, W.E.S.
1961 Fort McPherson, N.W.T. Geographical Bulletin, no. 16:86-103.
5. Hochwald, Werner, ed.
1961 Design of Regional Accounts; papers...Conference on Regional Accounts, Washington University, 1960. Baltimore, Johns Hopkins Press.
6. Hoover, Edgar M. and Benjamin Chinitz.
1961 The Role of Accounts in the Economic Study of the Pittsburgh Metropolitan Area. In Design of Regional Accounts: papers...Conference on Regional Accounts, Washington University, 1960, ed. by Werner Hochwald. Baltimore, Johns Hopkins Press.
7. Innis, Harold A.
1956 The Fur Trade in Canada. Rev. ed. Toronto, University of Toronto Press.
8. Isard, Walter
1960 Methods of Regional Analysis. Cambridge, Mass., M.I.T. Technology Press and Wiley.

9. Jenness, Diamond
1964 Eskimo Administration: II. Canada. Arctic Institute of North America. Technical Paper no. 14. Montreal.
10. Mackay, J. Ross
1963 The Mackenzie Delta Area, N.W.T. Canada. Department of Mines and Technical Surveys. Geographical Branch. Memoir no. 8. Ottawa.
11. Muller, Siemon W.
1945 Permafrost; or, Permanently Frozen Ground and Related Engineering Problems. U.S. Army. Military Intelligence Division. Washington, D.C.
12. Rahman, Anisur
1963 Regional Allocation of Investment. Quarterly Journal of Economics 77:26-39.
13. Spengler, J.J.
1961 Theory, Ideology, Non-Economic Values, and Politico-Economic Development. In Tradition, Values, and Socio-Economic Development, ed. by Ralph Braibanti and Joseph J. Spengler. Durham, N.C., Duke University Press.
14. Stefansson, Vilhjalmur
1941 My Life with the Eskimos (Abridged ed.). New York, Macmillan.
15. Stevens, W.E.
1953 The Northwestern Muskrat of the Mackenzie Delta, Northwest Territories, 1947-48. Canada. Wildlife Service. Wildlife Management Bulletin, series 1, no. 8.

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